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Les questions épistémologiques ont une certaine pertinence pratique pour les études qui traitent du cerveau et de l'esprit. Les problèmes épistémologiques touchent, entre autres, la subjectivité, l'objectivité, la métaphysique et les relations du corps et de l'esprit. Cet essai affirme que ces questions et problèmes sont la conséquence d'une opinion qui veut que les concepts soient un aspect d'une expérience première. Cette opinion conduit à la conclusion erronée que la différence entre sujet et objet est un donné premier, alors que c'est une différentiation secondaire qui est apparue lorsque la connaissance conceptuelle a émergé de sa base physiologique. Un changement de point de vue est nécessaire, comme le montrent divers exemples pris à différents domaines, notamment à la physiologie du cerveau et à la psychopathologie. La recherche pour la vérité ontologique, qui a été un moteur puissant pour les hommes de science, est en train d'être remplacée par des visées à but social ou écologique.

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Epistemology in brain-mind studies, its necessity and consequences

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Séminaire sur la Représentation
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ABSTRACT

Epistemological questions are of some practical relevance in mind-brain studies, although this has occasionally been denied. Epistemological difficulties concern, among others, subjectivity, objectivity, metaphysics, and the mind-body relation. The present essay proposes that these and some related questions and difficulties are necessary consequences of the prejudical opinion that concepts are an aspect of original experience, which chiefly results in the erroneous conclusion that the difference between subject and object is primarily given, whereas it is a secondary differentiation in the course of the evolution or emergence of conceptual knowledge from its physiological base, in close connection with verbal labeling of experience. The consequences of the needed shift in viewpoint are illustrated by examples from various areas, including brain physiology and psychopathology: the search for ontological truth, which has been a powerful motivator for scientists, is in the process of being replaced by social and oecological aims.

NECESSITY OF EPISTEMOLOGY

It has commonly been assumed by scientists, and sometimes even by philosophers (1), that epistemology is not needed for progress in science. But this opinion is erroneous in several respects, particularly concerning studies involving subjective human experience. One error of practical consequence is, as for instance Livingston (2) has pointed out, that brain scientists (he names Sherrington, Penfield, and Eccles as examples) have sometimes assumed that the relationship between brain and mind needs to be excluded from investigation because they adhered to the dualistic view that there is a fundamental dichotomy between body and mind. Aside from this, the study of psychological functions and of their disturbances in psychopathology must occupy itself, among other things, directly with the function called "knowledge"; to suggest that this can be done without studying the fundamentals of knowledge is at best naive; it also may block the access to important questions. There is in addition a special interest in studying epistemology with reference to psychological material: in medicine, the study of disease has often given the impetus for the investigation of healthy functions, because aside from the need for practical medical help, malfunctions may point to certain aspects, or part-functions, as being related to specific mechanisms (as studies on diabetes mellitus showed that sugar metabolism is influenced by insulin).

A concise formulation of the elementary epistemological situation is desirable as a background for mind-brain studies. This requires not so much new insights, of which there have been many over the years, as rather a description which is consistent in itself and contiguous with other areas, and generally acceptable, thus becoming available for cooperative efforts. To my knowledge, a formulation fulfilling these requirements has so far not

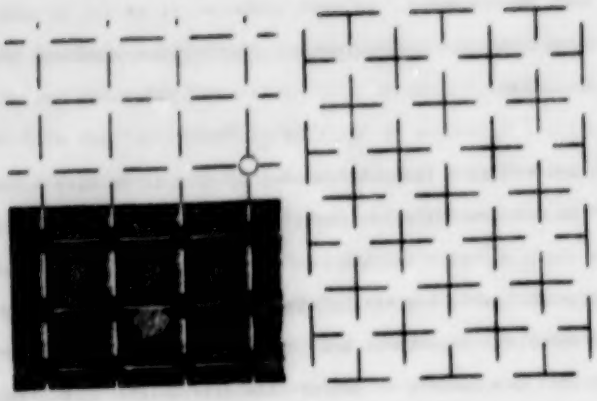
been available. And with all due respect, a potential "consumer" of epistemology can, upon sampling the literature, easily get the impression that we are still in the position of the legendary six blind men trying to describe an elephant, and perhaps here more so than in most fields of study: it seems that because a number of mutually contradictory positions can be held concerning the foundations of epistemology, a generally acceptable description of this area has been impossible, despite some recent progress, and despite many valid part-answers (indeed, I would be very surprised if the present essay contained entirely new ideas, even though I have not found some of them elsewhere).

EVOLUTION OF CONCEPTS AND THE SUBJECT-OBJECT SPLIT

Several topics have been at the center of epistemological discussions in science. There is concern about objectivity and reality of description, as opposed to mere subjective opinions. In particular, metaphysical statements, which deal with largely non-observable items, have been said to be incompatible with scientific methods and purposes. In psychological disciplines, the relationship of the material body and brain to the immaterial mind has caused much discussion for a long time, and this question is thought by some (4, p VII; 15, p. 188-189) to be entirely insoluble. Are such problems related to each other? And if so, how? Is a further fruitful discussion possible?

It is proposed here that these and some related questions and difficulties stem from a socially perpetuated early derailment of thinking, namely an inverted use of concepts: conceptualised experiences, and even

concepts alone, are mistakenly assumed to be original experience: and this assumption becomes the object of an unconditional belief. This results in the omission of an initial step in the epistemological analysis and invariably leads to dead ends (apories): its most prominent manifestation is the assumption, which is usually implicit and only rarely (5 Vol.2, p.342-343; 21) expressly stated, that the difference between subject and object (both of which are conceptualised experiences) is primarily given, or in other words, that separate subjects and objects, rather than a more global (non-conceptualised) cognitive experience, are the original content of our knowledge. This dualistic opinion is for instance clearly implied in Kant's Critique of Pure Reason (19,A19/B33) or in Weizsäcker's Unity of Nature (28, p.6, p.213). An elemental belief, deliberate or not, in primarily given subject and objects already transcends experience, in fact is not clearly founded upon experience, and may interfere with experience. If such a belief is held expressly and firmly it is automatically a belief in knowable metaphysical entities-in-themselves, because then the conceptual aspect overpowers the experiential one altogether. Concepts derived from such a belief, such as objectivity in the usual meaning, are metaphysical as well. If the belief is held less clearly but nevertheless not repudiated, the classical type of metaphysics may be rejected by the philosopher but something similar will nevertheless come to the fore. In this paper, the ramifications of the described proposition to various epistemological questions and other fields of knowledge are described, and it is furthermore suggested that the rectification of this early epistemological error will help with removing obstacles to a consistent epistemological description.



VISUAL GESTALT OVERDETERMINATIONS
The »non-existants« triangles, round disks, e seem brighter or darker than the background.
(from J. Walker, Sci.Amer 1988, 258, 96-99)

The inversion of the use of concepts and similar tools, with subsequent establishment of "autonomous" concept structures (polarised and other) has spread to other areas. For instance "psycho-social" tools like money, religion, or state power, to name only a few, have commonly been ascribed primary rather than secondary importance, and their corresponding structures ("the economy", etc) are sometimes treated in practice, and occasionally even in theory, as though they have validity overriding everything else. The inverted use of concepts can be seen as the starting point for such developments. In each instance, it is not so much the inversion itself but its absolutisation which causes problems, because the roots are forgotten.

If the dualistic (subject-object) opinion is in fact erroneous, why has it been so prominently maintained? The reasons for this are easy to understand. Many experiences, such as the perceptions of stones, trees, animals, persons clearly are of the object type, and others, like feelings, emotions, dreams, or conjectures are subjective experiences. Our own Gestalt and idea processes then render this distinction more precise than it originally is: this over-determination is a consequence of built-in properties like Gestalt-completion and "goodness" of form. We add our concepts, as "packaging material" and "handles" to the original experience which we thereby influence (parcel, and to varying degree over-determine and even distort). As is already the case for Gestalt formations, the overdetermination of concepts is both an important practical help in this use and a hindrance in further exploration. (Some of these features can be duplicated now in computer models: inversion of sensory processing results in feedback "optimisation" of the filter properties of sensory relays, so as

to conform to static templates (33)). The result is a categorical (i.e., unconditional) epistemological difference, for instance between subjects and objects, which is still further strengthened by labeling with words and by social consensus, which together strongly determine our "being in the world": the consensus in particular can be a much needed haven of safety. (We thus use the term "knowledge" here as meaning conceptual knowledge, in agreement with the usual meaning in epistemological discussion, although being aware that other shades of meaning are possible).

The developing conceptual distance between subject and object signals the new space for ideas with their versatility and exchangeability, as well as time for "reflected" in addition to automatic reaction, and the possibility and necessity of deliberate (planned) care for the future. The overall result is that usually the question is not even brought up whether dualism is right or wrong: an implicit dualism is, with a few exceptions, the valid currency, and its power stems largely from its being overlooked, its hiddenness (an epistemological "blind spot" has resulted). In addition, the prospect of giving up the dualist opinion can stir up a fear that this will somehow make the external world disappear, because the conceptual object is assumed to represent the (real) world. The early epistemological error thus has two roots: an "intellectual" one (unquestioned acceptance of the inside-outside difference), and an "emotional" one (wish for undoubted reality and certainty).

To ask the question expressly whether the subject-object split is primary means to answer negatively, the history of Western philosophy not withstanding, unless one wants to posit a sort of spontaneous generation (or else creation) of conceptualised subjects and objects.

The subject-object polarisation occurs as a feature (one might say complication) of the conceptualisation of experience. Human consciousness emerges from its physiological background in an initial step which is characterised by greater deliberation, by distance from the immediate involvement with the world, and very prominently (though not exclusively) by verbalisation. Verbal signals are used in communication with the understanding that they label the same experience for different persons. This is the only valid connection (at a single point, so-to-speak) which words have with experience, and secondarily with the "world"; but this connection easily leads to the erroneous assumption that they indicate (or in the form of concepts even are) a reality which is independent of anyone's experience, and this evidently also outside the context of communication between persons. This is how "objects" are born (as well as the subject which sometimes is neglected for a while but necessarily keeps reappearing throughout the history of thought).

Instead of being primarily given, the subject-object split is elaborated in this way from simpler types of experience, during both phylogenetic development (evolution) and individual maturation, and it is a consequence of the (mainly verbal) labeling of contents and of other aspects of awareness. (For this reason, developmental considerations are important in many contexts, as they have already been in the past, among other things in the form of etymology of words and of archaeology of meaning or of knowledge). The resulting conceptual "knowledge", consisting of a system of pointing labels (in conjunction with acquired practical knowledge of how to do things) is an exclusively human phenomenon, and as such it is the topic of philosophical discussion. It is not identical with the physiological

dimension of consciousness-unconsciousness or with awareness of the world which also apply to animals, nor with that world itself or our experience of it. The development of parcels of thought, like ideas and concepts (from the earlier stage of simpler Gestalt formations) leads to the novel establishment of a conceptual sphere or "world" as a sort of mental home, in addition to the physical and social shelters. It also includes the differentiation of an internal or subjective pole and of an external or objective one from the core of the idea, corresponding to the structure of experience. For instance in the experience of smell or vision there is always a perceiver and something perceived, and even in using number concepts, there is a counter and something being counted.

The term "world" should perhaps be reserved for the unconceptualised origin of our experience and concepts, even though it may appear self-contradictory to name something which by definition cannot be known. This is an old problem, but actually a pseudo-problem, because we want to do the same as with other verbal labels, namely to label an experience which in this case happens to be that: concepts arise from unconceptualised sources. Some early Greek thinkers, who were presumably still close to the origin (i.e., they were more "naive" than later philosophers) used the terms "hen" or "apeiron" for this source, and "aletheia" for the process of emergence (3, 38, 39). In all instances, our concepts are not that world but they try to approximate our experience of it. If that point is clear one does not fall into the error of metaphysics, i.e., of assuming that this unconceptualised origin can be conceptually known.

Whether or not one wants to venerate it (the One, the Ground of Being, etc), the origin is always present, even if one neglects or denies

it. In Jaspers' terminology it is "encompassing". Among other things, such a consideration shows that "the One" is a rather elementary item which does not necessarily require a complex mythological elaboration, although such elaborations have obviously been helpful in many different ways and for different cultures for the aim of staying in touch with the One (31). The practical social need for taboos and the sacred is a direct consequence of the pervasive presence of the One which cannot be permanently neglected, as it has been tried in some scientific and political doctrines. Despite the elementary nature of the One it has mostly been seen as high, above us, which makes staying in touch desirable as a goal and, in analogy to social structures, credible as an approach to authority. Religions, which originate from here, endeavour to render it graspable through conceptualisation (which sometimes even includes a secondary de-conceptualisation as in Zen in order to make its non-conceptual nature visible). In terms of ontology, everything (positive or negative) one can say about the One is wrong by definition, because it is unconceptualised. It necessarily "transcends", and in this particular sense it may be said to be apriori, or metaphysical. However, due to the need for guidance and certainty, it is concretised anyway ("quia absurdum") in anthropomorphic or other form, and even including such anti-conceptual steps as are prescribed in meditation or mysticism.

The difference and distance between subject and object inside the conceptual sphere is secondary to (or one of the features of) the emergence of ideas and not primary, gradual and not sharp, and at least in part learned and not innate. What is learned corresponds, so to speak, to a boundary, or an articulation, between two aspects of experience, which is pervasive but not of an all-or-nothing type. Due to its pervasiveness and

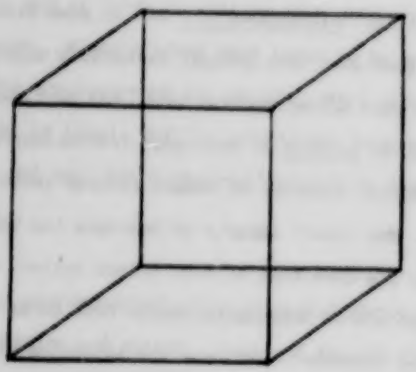
to social reinforcement this conceptual difference becomes so engrained and self-evident that everybody has a strong tendency to render it conceptually absolute. Animals presumably distinguish between inside (self) and outside (other, or world) in the same way as we do, except that, having no concepts, they cannot make our conceptual mistakes of overdetermination such as mistaking concepts for "the world", including believing in metaphysical entities, such as aprioris or noumena.

Both Gestalt and concept (idea) units derive from external chemical and physical inputs which in the sense organs are transduced into electrochemical nerve impulses, and then to varying degree elaborated, parceled, encapsulated, and labeled (for instance verbally), and thus they always differ from the input. their similarity to it cannot always be taken for granted. In the case of visual perception, for instance, we can only expect to derive knowledge from what happens in the retina, not from the physical events producing the picture in the retina: furthermore we do not directly perceive electromagnetic input outside the visual frequency range. Also, the perception of color depends on processes in the visual pigments and the neural network of the retina in processes which only partly reflect the wave-lengths of the incoming light (20). The further the final conceptualised product is removed from the input, the greater is the subject's (and usually society's) contribution: this is particularly so for superordinated concepts which deal with more general aspects of experience.

A phenomenological description of experience provides further support for the unitary opinion. Quite a few experiences are located in an uncertain area, as far as the subject-object question is concerned. For instance, parts of our body can be seen by us subjectively ("from inside")

or objectively ("from outside"), and if some disturbance of sensory input occurs, a part of the body may be experienced as altogether foreign. A fairly undifferentiated state can be experienced under conditions such as waking up from a general anaesthesia, while on the other hand during dreams the subject-object differentiation is largely present, possibly as biological readiness exercises during rapid eye movement sleep. In psychopathological states, a narrowing of subjective space can occur so that events in one's own body or mind are experienced as due to outside personal or impersonal forces. But evidence from daily life shows this ambiguity as well. For instance, is the probability of a coin to turn up "head" or "tail" subjective or objective? Are statistical, mathematical, logical laws, and indeed knowledge in general, subjective or objective? The mathematical definition of "chaos" is that we cannot grasp a situation with mathematical tools, and according to Bohr, physical theory deals only with a world which is being observed (26 p.6), i.e., by someone. One can often say that some instances fall more into the one or the other sphere, but this in itself again shows that there is no sharp division: attempts to categorise exclusively are artificial, i.e., conceptually overdetermined.

Contemporary efforts to discover the brain mechanisms responsible for subjective experiences usually deal with scientific objects only: both the brain function and the subjective events are there conceptualised as objects. Such studies cannot reveal anything about the epistemological question. Both types of question are important but must be clearly distinguished from each other - this must be emphasised because in practice they are commonly confounded.



NECKER CUBE

THE FUNCTIONS OF IDEAS, CONCEPTS, AND BELIEFS

Epistemological enquiries must therefore be based upon considerations going back in the field of conceptual knowledge to before the subject-object split and describe the function of ideas as they emerge from the physiological basis, and the steps thereafter. This development of conceptual tools is an evolutionally new elaboration of function, characterised, among other things, by a typically human greater task-oriented versatility (exchangeability and to some extent manipulability) of mental content than even with Gestalt formations which are already present in some form in many animal species (6); and particularly by an enormous increase as well as coinage of knowledge (formalisation and standardisation which promote social exchange of ideas) through verbal and other communication. The "tool" aspects of concepts (as well as of sets for behavior) is in its core that of such coined units: they are "hardwired" in contrast to less stable components (which have to be specifically arranged for a particular occasion), and have the advantage of reliability and speed, and the disadvantage of possible inappropriate inflexibility. To know means to conceptualise, predominantly though not exclusively in verbal form. We are in a sense prisoners of our conceptual world (27 p.263), except that in principle we are at liberty to modify and enlarge it.

As a further corollary of this exchangeability and of the initially ad hoc and in principle temporary nature of conceptual tools, ideas have developed a quasi-independent existence. A trend in this direction is already evident for their precursors, the Gestalten, such as with the spontaneous perceptual reversals which occur while looking at ambiguous figures like the Necker cube. It becomes stronger, largely in connection

with verbal labeling and communication, for concepts and ideas, and to some extent concepts may be seen as stagnant, or even "dead" (27 p.261-262). In the course of this differentiation, attention to the tripartite (subject-idea-object) nature of ideas (and experience generally) becomes unavoidable: for instance the Necker cube reversals evidently are not "objective" events in the design one looks at, nor are they intended by a "subject": the most one can say is that they somehow happen in the mental machinery. In addition, the social coinage also contributes to the independence of ideas, and it leads to writing them down and even make them objects of investigation. Plato's ideas were taken to be more real than the fallible subject or the appearance of the object. Ever since, questions like what is real, what is ideal, what is subjective, what is objective, have been of concern, and call for a re-consideration of the original experience.

Ideas provide a circumscribed unity of mental content, which is needed for focused cognition and action - rules of thought (i.e., logic including mathematical logic) help to achieve such unity of conceptual tools; and further, because the exchangeability of mental content could result in disconnected or random function, stability mechanisms are necessary, concerning both selectivity of perception and preparation for action. This need is the likely evolutionary basis for its answer, namely the establishment and maintenance of beliefs, the contents of which are arbitrary (within the limits set by experience) as far as the functional requirements are concerned. Knowledge implies belief in its contents, or objects. The contents can be conceptual tools of differing degrees of stability: hypotheses or theories, or "the truth" (with the assumption that some absolute reality, independent of being perceived, is behind, or

causing, the appearances), and they function as internal approximations (models, constructs, scaffolding, representations) to the outside world. They have also been called metaphors, but this word is misleading because it may suggest a looseness of contact with the world which is not typical for scientific concepts at least. In the effort to have such a construct approximate experience (and beyond that, the "world") a problem arises because each of the component concepts (which are its building blocks) only has a point-like connection to the world, as discussed earlier. The undertaking thus results in a more or less continuous mental structure parallel to and with multiple point-like contacts with experience and the world. Much may therefore be overlooked in such an approximation. More generally the ad hoc origin of concepts (for the purpose of such approximation), together with their secondary developmental origin, precludes the possibility of ascribing to them an absolute truth or apriori (noumenon) status. The much needed construction and stability function has the built-in side effect of restriction and even prevention of the development of different and new ideas.

Most ideas also become polarised, as already discussed, with an external (object) and an internal (subject) pole. Mind-body (or mind-brain) dualism as a theoretical position is a direct consequence of the erroneous aprioriation and subsequent inverted utilisation (i.e., having conceptualised experience and even concepts alone play the part of original experience) of this polarisation. The criterion which distinguishes given ideas and concepts as functional or static is that: functional concepts can in principle be followed (analysed) to their functional roots, without obstruction by aprioristic walls: the latter are unsurmountable in static concepts which are not only derived from observation of function but also

from metaphysical assumptions.

TRUTH, REALITY, and METAPHYSICS

Apriorisation of ideas implies leaving, transcending, or extrapolating from, experience (as so far conceptualised), plus the assumption of the postulated apriori as that which is not only known (independently from experience) but also absolutely true. If an analysis starts from such an aprioristic basis as the presumed reality, unsurmountable difficulties arise: both subject and object become unknowable because in isolation from a central idea as organiser of present experience the only remaining element is the word or an empty concept, for instance of "I", in our head, as Kant noted (23), or the "object" which is then no longer a temporary scaffold, but becomes a noumenon, or thing-in-itself. This situation has been present in one form or another since at least the time of Parmenides; recently it was characterised as follows: "The history of Western epistemology is a history of more or less brilliant failures to resolve the paradox inherent in the traditional conception of knowledge. To make sure that it is "true" the knower would have to compare the known to the unknown reality which that knowledge is presumed to represent" (9). Traditional ontology and epistemology, as well as the usual type of objectivity, come with their aporias (which result from their aprioris) built into their foundations.

The picture is less confusing when the extrapolation's two components are kept apart. It is necessary to transcend our crystallised (conceptualised) experience, not only in order not to be confined to it but also because we must deal with the non-conceptualised world from which

experience arises. But to say that we can conceptually know the world beyond experience is an error which must be avoided. We only know our conscious inside approximations to the world (Gestalten, ideas, concepts, models, etc: a point which has been emphasised by the American pragmatic philosophers), and the extrapolation often results in new or revised internal approximations.

An example of a simple extrapolation is the short term memory based belief called object constancy, where existence of an object is assumed in the absence of sensory input, for instance when a dog runs behind a car and disappears from view. A more pervasive extrapolation from input and from experience is the assignment of objectivity itself: this includes the assignment of object-individuality and unity. It probably arose from a primordial world view which was egocentric but then through empathic understanding saw others in the same way as oneself, namely, as functioning units: this type of comprehension was then extended to other living units and then even to non-living "objects" in an anthropomorphic and mythical world view. The modern "object" is a pale distant derivative of this but it maintains the connotation of unity, such as when a cloud is seen as a unit. For logical and mathematical manipulations such objects will do, but not for epistemological analysis. (Similar considerations apply to other concepts which started from an anthropomorphic basis, such as purpose or meaning). The metaphysical mistake occurs when the knowledge of the original extrapolation from our experience is forgotten or deliberately discarded, and the assumption is made not only that we know about an independent world (which can be a shorthand statement for a helpful instrumental transcendence of experience) but also that our concepts concerning this external world have an existence which is independent of anyone's mental activity (an

example is the erroneous ascription of independent life to mathematical, logical, causal, and linguistic structures and laws). Verbal labels can strongly reinforce not only the unity of concepts but also their metaphysicalisation, i.e. the belief that such monads or noumena are the essence of reality.

In scientific endeavours, objectivity is desirable: this minimally means descriptions of the world which are independent of subjective bias. But in extension of this, some dualists assume that we can know and say something true about the unknowable world-in-itself, and in that case we are once again faced with a realm of ideals or absolute objects, noumena, which are beyond our grasp. We need to remain aware that our concepts can only be functional approximations in our head, helpful as temporary fixation points, but if they are seen as having absolute validity, they may impede the elaboration of more appropriate approximations.

A particularly marked extrapolation from input is the assignment of unity and reality to very predominantly non-experiental units, such as the most general or superordinated ("highest") concepts. These tend to owe their existence more to personal and social functional needs (for unity, comprehension, certainty, comprehensiveness, guidance, identity, the prevention of hybris, etc.) than to sensory perceptions, and have the greatest proportion of mentally added material. If they are believed to have an existence which is altogether independent of experience, the subject matter is metaphysics, which term we here restrict to the assumption that the unconceptualised origin of knowledge (the unknowable) can be known with the help of conceptualisation. Metaphysics of this type is impossible by definition. It has been said that a metaphysician (i.e., this particular

type of metaphysician) is like a blind person who looks for a non-existant black hat in a completely dark room, and finds it (though one should add that the same applies to the common-sense belief in knowledge about objects-in-themselves). Metaphysical-objective interpretations of reality remain unsatisfactory for this reason: they are built upon unknowable ad hoc entities like noumena or monads.

Many other, though related, meanings of the word "metaphysics" are in use (30), and are not necessarily entirely impossible, if they mean something other than knowing the unknowable. Jaspers, for instance (5 vol.3) defines it as "enlightenment of the approaches to transcendence of existence". Another example is the state of "Zen" (36), which is characterised by abandonment of all concepts, and which might be included in some definitions of metaphysics. And of course, as we have discussed earlier on, the unconceptualised origin, the apeiron or the One, always transcends conceptual knowledge, and in that sense may be called metaphysical. For the purpose of the present epistemological discussion, the word is used in the above mentioned restricted sense, which to me appears to be the crucial epistemological aspect. Generally, it must however be said that the word "metaphysics" tends to obscure discussion, because of its different possible meanings, and it may be better to avoid it.

The most general concepts are nevertheless powerful structures in the sense that they are encompassing, can accommodate the contradictions of more specific ones, and in that sense are more immune against perturbations, even though they often compete with each other and are mutually exclusive. On the other hand they themselves can be exchanged in conversions, because

their experiential base is narrow while in this case specific "lower" concepts are more immune. Since images and words are tools for our mastery of things, some religions forbid them in connection with the sacred, so as to keep it out of the reach of our mastery, and to reinforce its position as an unconceptualised source ("above" us and even beyond our "highest" concepts), which is of course what the reality of the world is in the first place.

Truth and reality of a content of belief are identical to being believed in, and they are in principle continually subject to re-evaluation on the basis of experience, that is to say on how the believed concepts "perform" in daily life, with the exception that absolute truth implies absolute belief without re-evaluation, and one person's absolute truth may be another's falsehood. Doubt leads to re-evaluation of beliefs and of the steps which led to the beliefs, not only concerning beliefs in functional relations but also in noumena and deities, which then may again become accessible to analytic thinking. Since the highest concepts arise to a large extent independent of sensory input and of other earlier steps, it follows that "if you believe it, it is true" or real, without the possibility of re-evaluation (unless one follows the opinion of some authority; historically such sources of authority have been: religious revelation and doctrine, philosophical doctrines, scientific beliefs, political dogmas, and more recently opinion polls and committee recommendations). In this unstructured and slippery are a conceptual conventions are particularly useful. The situation is similar to telling the time while standing on the North Pole: since all longitudes meet there, they are of equal weight and cannot help for guidance: it is any time you say it is (unless of course in the future some international authority

decrees something different, such as that "universal" Greenwich time should apply).

The following schema summarises the main points of the preceding discussion of human experience.

(a) INPUT (non-conceptual origin, primary experience)

(b) PACKAGING (Gestalt, idea, concept, label: in polarised tripartite subject-idea-object form)

(c) ACCEPTANCE (belief in truth and reality: objectivity and metaphysical scaffold, either falsifiable or absolute, depending on a person's openness)

The sequence a b c is developmental (evolution, maturation, emergence): of this, most of b and all of c occur only in humans. The inverse sequence c b a is analytic. A common error in analytic procedures consists in the omission of the second step b a, with the result that concepts are thought to be, primary experience, an assumption which is commonly fixated in absolute belief.

A correction of the procedure does not in itself explain anything but it can unblock the way for the analysis of a number of questions.

SOME CONSEQUENCES IN VARIOUS FIELDS OF KNOWLEDGE

The following considerations are meant to show that the proposed foundations of epistemology are in principle capable of contiguity with a number of areas and questions (although they are obviously not intended to

be complete, neither in any of the areas, nor in overall scope): because the generation of ideas is an elementary procedure, it must be expected to be relevant for all areas of thought. I am not an expert in most of these areas, but as a starting point some such attempt is needed in order to pursue this matter, even at the risk of making mistakes along the way.

Conceptualisation and belief systems have emerged as specialisations from within original experience. Their exchangeability and quasi-independence have often resulted in the Western epistemological derailment in which not only conceptualised experiences but even mere concepts were mistaken for original experience: aprioris, noumena ("objects"), metaphysics. There have been many counter-efforts to offset the derailment, with varying success: these attempts often result in new difficulties of their own. Some prominent types of effort are the following. Monistic philosophical approaches try to provide unity of experience by promoting the subject, the idea, or the object to the position of original experience - erroneously, as we will discuss below. Eastern philosophical-religious teachings try to prevent the derailment by advocating mystical experience of unity and the avoidance of the power of ideas: the problem is that this tends to result in a state of passivity. Similar to this is the opinion that conceptualisation (knowledge, logic) per se is the cause of all problems: the resulting proposition to return to a pre-conceptual state would amount to a regression to the pre-human state, if it were taken seriously. A recent advocacy of "superconsciousness" seems to be different from this in words only. What is needed, it would appear, is something rather less complicated: simply the awareness that our concepts and beliefs all come from and remain embedded in an original non-conceptual experience, which continues to be of pervasive influence. Whether one wants to see this

as below us (physiology, ground of experience, our animal past, etc), above us (something greater than oneself, the divine, the goal of enlightenment), around us (the unconceptualised ground of experience), or in us ("deep structure", the irrational, the unconscious, the soul) is mainly a matter of world-orientation, self-appraisal, emotional needs, and social belief, not of epistemology.

Historically, doubt about the European traditional opinions concerning the nature of reality was a consequence of the work of Copernicus and Galileo and resulted in the attempt by Descartes to find a point of certainty inside himself (1): "je doute donc je suis", which could be taken to mean that deliberate reflection heightens self-awareness. It has been pointed out, however (24), that Descartes was not in any serious sense a sceptic: he himself emphasised that pervasive doubt (he sometimes called it "hyperbolical doubt") was really a device for identifying the indubitable. And thus he utilised doubt not only to assert his own existence in a positive way: "Je pense donc je suis", but also the certainty of existence of other things if they were "immediately experienced", including some apriori truths ("vérités éternelles"). With this, he re-appointed Parmenides and Plato as his ancestors. Descartes showed the importance of conceptual thinking but not that thinking is responsible for, or proves, his own existence, or the existence of anything else: both are impossible. My thinking by itself does not create nor prove any reality other than the concepts in my head. Proofs make doubtful experiences true by showing that they are extensions of accepted (i.e., believed) truths: they do not create reality out of nothing. One can of course use one's concepts, logic, and mathematics to deal with the world, and this is an important aspect of the progress manifested by the rationalism's instrumental thinking: but to say

that "space has" three (or some other number of) dimensions, or that falling objects "obey" the law of gravity, can be misleading. And at least the mathematicians now seem convinced that absolute certainty is impossible, since Gödel showed that mathematics cannot prove the contents, or substrates, of its calculations. At any rate, Descartes' "exercise" would seem to demonstrate the intensity of our need for doubt-free beliefs.

We are often not aware just how intensely we still follow the rationalist guideline of cogito ergo sum, which necessarily implies that our conceptual sphere is identical with "the" reality. Assuming this we believe that the world is known and that we are and do what we know (to the extent that the unconscious had to be "discovered" not so long ago), ignoring altogether that the world is an unknown source and that conceptual mental activity is a new stratum of function above, and based upon, physiology. That this situation has developed in such a manner is less surprising if we keep in mind that conscious knowledge has started from inside out, with few concrete specifics and a large need for comprehension and certainty: our own mental function is one of the last items for specific attention because for security reasons its basic properties were vaguely suspected to need permanence (immutability) in order to fulfill its central role in our comprehension of the world. Although the historical trend is away from static and toward functional guidelines, the need for secure structures, for the comprehension of personal and group identities and as guides for the conduct of life, remains strong and thus some static bases of belief may always be retained: there will thus remain a practical problem how to "interface" them with each other and with our analytical knowledge of a world in flux.

Theories, models, and other "rational" belief systems can never be verified but they can be falsified by additional observations, as Popper showed (7). If models are compatible with further observations it can be concluded that the model is, in that particular respect and to the extent of the observation, an appropriate (i.e., functioning) approximation, but "verification" would imply the impossible confirmation that they are identical with the world. In addition of course all theoretical and other positions proclaiming general persistent truths independent from experience are eo ipso false in that respect: in as much as they are not contradicted in other ways they may be reconverted to functional approximations, as temporary bases, fixed points, structures, scaffolding, to deal with Heraklit's flowing and alienating world.

According to the hypothesis proposed in this essay, various epistemological positions represent different possible reactions to a situation which they all share, as an "initial common path", after which no amount of theory building can result in restoration of genuine experience, namely the early epistemological error of inverted use of concepts, including the assumption of a primary subject-object split and neglect of the non-conceptual origin of experience. If that is correct it would follow that it should be possible to trace their differences back to, and to before, this common root. This could have practical consequences inasmuch as it may become possible to show, on a theoretical level at least, that the differences between them are not fundamental but rather secondary and of practical type. (It is in a sense an unfortunate constellation, because it has historically given rise to enormous futile efforts, although there were many fortunate consequences as well).

Is it possible to maintain differing theoretical positions in view of the ever present uncertainty ("everything must be doubted"), without making unwarranted assumptions? One may say, for instance, that our relation to the world is like a game, in which we may use various sets of rules or metaphors (26) while trying to understand, and to influence, the happenings. Similarly, the situation has been compared to a dance (27). The question remains in this case how serious such a game becomes: does one remain content with playing, or is there a core which gave rise to it and which continues to matter, independently of what game is played? Even if the elementary events in physics can be seen as a dance, life can not primarily be a gamble, because it is the human effort of dealing with the world: and it is not likely that the origin of knowledge can be arbitrary. The modern trend to replace "reality" by opinion polls is also not satisfactory. Some existentialist philosophers recommend facing "nothingness" (the lack of structure, of certainty, of contact with the origins of being, etc) as the step necessary to overcome nihilism.

In another, much more common, opinion the need for (unalterable) certainty remains prominent, and thus for some type of metaphysics. In this case, is it possible to use metaphysics in a makeshift or diluted sense, so that it provides a reasonably stable world view which is not quickly annihilated by further experience? Kant said that things-in-themselves (noumena) cannot be known: "the concept of a noumenon is -- only a borderline concept, in order to limit the arrogance of perception, and thus only of negative usefulness" (19, A255/ B310/311). Space and time and the categories are defined as necessary forms or concepts of the mind, and thus, one might say, properties of the subject. Kant spent much effort in

discussing how such apriori properties connect to the observed objects: this question becomes less difficult if the primary subject-object split is not assumed because then such structurising features can be understood as properties of overall perception and understanding (both machinery and function) like for instance the structure and function of the retina and occipital cortex result in the properties of vision, or like a number of anatomical and physiological properties (which no one would label "apriori") determine physical movements. In the more recent literature the physiology of intellectual functions is sometimes called the "deep structure", a term which avoids both metaphysics and physiology, but fails to clarify the issues. The absolute (apriori) character of Kant's forms and categories of thinking gives them quasi-metaphysical status, despite his dislike of traditional metaphysics: the certainty is no longer obtained from outside authorities but from assumed unalterable and apriori aspects of human thinking (following Descartes' erroneous procedure). It is in principle possible to maintain such an opinion provided a disclaimer is built in, to the effect that we are dealing with (provisional) safety structures rather than persistent metaphysics. In order to avoid misunderstandings, it may, however, be better not to use the term "metaphysics" for this type of structure.

At the point where metaphysical concepts become important, some others have suspected that they might be dealing with fictitious products, or perhaps with religion or poetry. They then went on to reject transcendental and particularly metaphysical concepts altogether in favor of "positive observables", apparently without noticing that their "instinctive belief" in an "independent external world" (8) deals with noumena, unless the necessary precaution is taken to restrict beliefs to one's internal

approximations. Because the subject-object split implicitly remained and thus the noumena as well as the rejected metaphysics, the inevitable result was that the positivists and their descendants had to eventually reject everything except recordable products of speech like sentences, statements, formulae, or the "archaeology" of word uses, etc., as "objective" material for analysis, thus running out of "world" and in addition circumventing the epistemological basis altogether. In this connection, an important consideration about words and language: language is a development which is at least as secondary to original experience as the subject-object split: and using language as the basis of knowledge is an even more misleading error than using the subject-object relation in this way. It amounts (although unintentionally) to saying "I speak therefore I am", and having the rules of speech and counting take the place of the non-conceptual universe.

Jaspers (5, Vol. II, p. 343) described the inside-outside difference as a tension between the subject pole and the object pole - though without acknowledging an origin from a unitary experience. Philosophers who were considered monists, such as Parmenides, Comte, or Hegel, also do not seem to have discussed a primary experience before subject, idea, and objects, but instead tended to see only one of the conceptual aspects as valid, and to extend it to include all experience. This happens automatically if it is simply assumed that mind and matter, or subject and object, "are identical" (e.g., 26). This opinion misleads due to incompleteness: the common origin of both poles remains hidden, but the investigator needs a single focus for his world view, and therefore one of the aspects of concepts (subject, idea, or object) usurps the position of the origin in belief systems such as solipsism, idealism, or materialism. Besides, subject and object are not

the same but rather opposing poles of thinking. "The same" can only be their common unconceptualised origin. A secondary synthesis of subject and objects "at a higher level" as it is sometimes expected is not possible after the subject-object split has been accepted as fundamental: the One has to be acknowledged from the start: or more exactly: its authorship stems from before the start of concepts, and cannot be secondarily improvised or sythesised via concepts. In addition, as Jaspers (5, Vol. I, p. 212 ff) pointed out, both idealism and positivism present closed world views, with a claim to (in principle) complete knowledge, abandoning openness, decision and freedom (p.233), while in contrast for Kant ideas were unending tasks (p.234). This is an important point, considering that the physiological processes which constitute the basis of our thinking are never "complete" except after death.

Naively, one would expect philosophical phenomenology to be close to or identical with the present approach. But historically, as developed by Husserl and his group, phenomenology has emphasised a non-empirical nature of its subject matter, and it practised an intuitive insight into the "essences" of things which was supposedly quite independent of experience (41). This means that they concerned themselves with the middle step of knowledge (packaging and labeling) rather than the whole process, and it was only later, in the work of Heidegger and others, that the origins became the object of study.

The difference between knowledge and world is not always made clear in discussions about structuralism and constructivism and some similar theoretical frameworks. The external world contains living units, but no concepts: it is our mental processes that can package inputs as concepts.

This difference between world and knowledge is crucial here, but it is overlooked when a primary subject-object split is assumed because then the conceptualised object is seen to be "outside", and an unavoidable second erroneous step must follow: either the conceptual object is assumed to be the original source (which is impossible), and this ontological object turns out to be unknowable because its only knowable component, the concept, is in our head and not an aspect of the world. The attention then becomes focused on the fictitious noumena and is not available for the investigation of the underlying situation. Or else, as in the case of "radical constructivism" (21), our concepts are once again delegated to build the outside world, including other people.

The need for adequate appraisal of the world can easily clash with the need for certainty, not only in the religious and political sphere but (and this is sometimes overlooked by convinced atheists and materialists) also in the natural sciences and in everyday life. We need firm beliefs for the build-up (construction) and maintenance of our guidance system in face of the uncertainty, instability, and vulnerability of the phylogenetically recent expansion and differentiation of brain function, particularly concerning evolution of exchangeable concepts: only a few interpretation and action patterns are developed or selected and codified as "correct" or "good" or "true" or "ours". Religious and other rules about social, including sexual, behavior are a particularly clear example. Thus, metaphysical beliefs may be both tactically useful (some would say necessary) and intellectually impossible at the same time ("credo quia absurdum": this statement, derived from Tertullianus, slightly overstates the point).

But practical non-static possibilities to avoid such a clash are less remote than they may at first seem: a mystical faith, with personal experiences of unity, etc., can be held without conflict if it does not pretend to offer "the truth" independent of experience: and so can analytical science if it considers its conceptual fixations as temporary rest points rather than as absolute truths. In both cases, a functional approach is maintained. A functional basis for action is also evident if we for instance consider what has been called the unconditional (i.e., categorical) imperative as a maxim or guideline for action which mostly goes beyond individual biological and psychological needs but nevertheless follows from functional needs (such as rights for others which by now include not only all humans but some other living forms as well): in that case it is not based upon an apriori or metaphysical command but prompted by needs arising from life in a wider than individual context.

But what about the cultural aspect: why, for instance, could the old Egyptians do with the mythical explanation that a sky goddess swallowed the sun every evening and gave birth to it in the morning, and we cannot? And more generally: how does scientific progress influence philosophical interpretations? Clearly, it is the increased overall knowledge, our improved mental "approximations" to what is going on, which make it less and less possible for us to maintain defective explanations with mysterious ad hoc patches in any part of our understanding of the world in general and of knowledge in particular. The new (more adequate) mechanisms suppress (inhibit) the older ones, in both the biological and social spheres, although in difficult situations the older ones may re-surface. Overall systems of thought and belief (philosophical and other) have probably always been the resultant of two main needs, security and understanding, in that

order: because one needs guidance as well as a nest or cocoon (such as an approved identity) to grow in and to retire to before one can start exploring. As understanding grows it invalidates some of the fixed bases of security which then must be replaced by something else. The ad hoc components were needed but they also may result in an underemployment, and often stultification, of the human mind.

Such cultural considerations can also help further to understand the peculiar situation we are in with regard to the subject-object split. It is almost certain that people were impressed and somewhat bewildered by the unexpected power of some of their own developments and inventions: words and concepts at first, and then numbers, geometry, and so on. To reassure themselves, society first explained this power in mythical ways, and later replaced that by the ascription of a super-individual absolute existence to words (etc.) even though being aware that they somehow represented a function of their own mind. This metaphysicalisation of words, concepts, etc., as one of the consequences as well as pillars of the primary subject-object split, has contributed to making that split fundamental to the Western world view, and has therefore only in relatively recent times become doubtful. We have been caught in a vicious circle.

But a functional description must replace not only the mythological forces in the old explanations of nature but also more recent but still mysterious ones like the instantaneous distance action of gravity assumed by Newton, which has been replaced by Einstein's space-time geography and gravity waves spreading at the speed of light: Kant's apriori time and space: the ether theory of the 19th century: or like the incomprehensible primary subject-object split in Descartes' epistemology. Among contemporary

mystifications is the opinion that we (as observers) "create" some of the elementary particles of physics. A definition of such contemporary mystification could be that it concerns something which is, or could be, known but is rendered mystical in order to provide relief from analytic thought - this in contrast to the original mythology which was an ad hoc explanation where analytic thought was impossible at the time. Because rational analysis cannot provide answers for all questions, mystifications are sometimes valued higher, even by some scientists. But such mystifications are examples of conceptual overdetermination. They must be distinguished from original conceptualisation (aletheia) of new experiences or observations, even though one may say in both instances that a non-rational (or "mystical") event occurs: the distintion is important because in the first case (aletheia) a new intellectual tool is created, while a deliberate mystification with existing concepts tends to block further exploration and create a doctrine instead.

That subject and object are only secondarily separated in our conceptual sphere, makes the mind-body problem, as a direct consequence, easier to address. It is not sufficient to state that physiological processes are "the basis of mind", because this does not clarify the elementary situation. Rather, the question has several facets, such as how brain function or emotions influence body functions (this is a psycho-physiological problem); the self-organisation of the hierarchically ordered central nervous system (a developmental and physiological question (11)); and the relation of the "non-material mind" to the "material body" (this is an epistemological question). The physiological aspects are in principle open to empirical investigation but not the epistemological one. The latter is a faulty question stemming from the assumption of a primary subject-

object split (which turns out to be an unscalable wall once it is adopted). There is indeed nothing which would have to be brought together because subject and object are not separated: both are always aspects of the subject-idea-object unit of human conceptual experience. But, one may ask, if a surgeon stimulates the brain in a particular area and the patient has a sensation: how does this come together? Here an event is perceived in two (or more) different ways, and the experience can then be shared, verbally or otherwise, via communication. In principle it is the same situation as pinching one's own skin and feeling pain from it: several types of perception can relate to the same "object" and together (through internal communication) they produce, or conform to, our idea of the object.

The external world will not disappear with the unitary point of view (that subjects and objects are only secondarily separated). This external world is the world of the concept-less animals, and it is also the unconceptualised origin of all our knowledge (i.e. of our conceptual sphere or "world"). Do "objects" exist independently of being perceived? NO in terms of conceptualised objects, but YES in terms of preconceptual input. One can occasionally encounter a monistic opinion to the effect that mind and matter "are the same". This statement is ambiguous if the relation between world and conceptual sphere is not clarified. The concepts of mind and matter come from the same origin, as discussed earlier. But concepts can never be the external world - that would be solipsism, once again, and it would imply that animals "have no world". As our knowledge increases it approximates or replicates the unknown world better: we know that because the increase is a response, inside our self-contained (individual and communal) subject-idea-object bubble of human knowledge, to contradictions and gaps in it as compared to further input from the unconceptualised

source. We respond to the external world (as all living beings respond to it), whether or not we possess a conceptual approximation to a given part of it. The knowledge can help us to respond in a more differentiated way: we then construct a more adequate conceptual approximation with such external feedback in an ongoing process, largely with the help of inventions (new tools) which make additional aspects of the external world accessible to our senses, so that then they can in turn become parts of our conceptions. This changes nothing about the basic situation, and the additional knowledge is just a further approximation step "inside the conceptual bubble". Also, more general conceptual changes, such as relativity or quantum physics, are such attempts at better approximation to the unknowable world: they are not "objective truths" but better (more efficient) models.

It is in principle wrong to say that we know the external world, but it can be useful to say it if we are aware that it is a shorthand statement meaning a never-ending process of construction in our mind of a "conceptual world" and of its approximation to the physical and chemical input which our sense organs translate into neuronal information and which as physical or chemical events becomes known to us only much later during development, namely through scientific concepts. If we have a presently adequate approximation to a part of the world, it is still in principle wrong to say that we know that part of the world. The history of ideas and of science teaches us that in addition to the basic error in this assumption such approximations have undergone further modifications. This often happens initially because something does not work at the fringes of the concepts' reach, but subsequently it turns out that the concepts themselves were inadequate (see 19th and 20th century physics). This is so because ideas are static and finite ("eternal and perfect" according to Plato's earlier

writings) whereas the unconceptualised world is in flux and open, and we can be certain only about our present ideas, in case they are well formed.

Ideas, concepts, and theories, with their multiple point-like connections to experience, approximate aspects of the world. If their origin is forgotten, they sometimes play tricks on us. A simple example is that we, or our clocks, count the course of time, which then can be shown graphically along a line: a common error is to assume that this represents, or is time: and from there to jump to phantasies like those of time reversal (which is reinforced by technical possibilities like playing films backward). But the same opinion is contained in the scientific assumption of "essentially reversible physical laws" (28 p.192) or "symmetry" of laws. Only fairly recently has this question been specifically addressed, for instance in philosophy by Heidegger (3), and in physics by Weizsäcker (28, p.192-194): they emphasised that there are fundamental differences between past, present, and future. The problem, here, in general terms, is once again that of an unwarrented reversal of concept use, where a concept, instead of original experience, is taken to be reality.

Another example is the ambiguity of the concept of "coordinate system" in the theory of relativity. Einstein (35) used the term "observer" (i.e., subject) on a number of occasions, always in the sense that he is at the origin (center) of a resting coordinate system, but the relationship between observer and coordinate system, i.e., the epistemological aspect, is not systematically examined. Moving coordinate systems seem to be described as having a (noumenon or inverted concept) status of existence which is independent of being observed: but at the same time they are observed by the subject and for this they have to be relativistically transformed from

the point of view of the resting "observer coordinates": because the subject can only know of other systems through his (or his instruments')vision which must utilise light or other electromagnetic radiation. As soon as a subject is present in a moving coordinate system, the latter is his resting system which is not transformed. The world view of relativity theory is therefore consistently subject dependent: the noumenon (the moving coordinate system) is in effect "de-noumenalised", which means that it loses its status of existence independent from being observed. The whole thrust of relativity theory is to mathematically describe the activity of a "resting" subject who observes moving mechanical or electric items. As a consequence of the lack of epistemological clarification this is not immediately evident from the original (35), nor is it, to my knowledge, apparent from the secondary literature on relativity, which has instead tended to pursue the "objective" (i.e., noumenon) approach of logical positivism and related routes, so that the subject finally was lost sight of altogether.

Specific difficulties arise when the original experience is missing, and it is attempted to derive or "construct" it secondarily from concepts. Such a situation exists for instance concerning the nature of subatomic particles which are inferred from their corpuscule-like or wave-like effects which can be observed (the corpuscle and wave concepts were both extrapolated in the 19th century from original macroscopic experiences but without connection between them, and thus cannot easily be brought together in the absence of original experience (29)). Prompted by his collegues, Heisenberg decided to deal with observables only and to leave aside hypothetical micro-physical constructs such as Bohr's corpuscular orbiting

electrons. He then found that there remained a fuzziness (Unschärfe-Relation) between the corpuscular and wavelike image ideals (properties), involving changes in energy levels of invisible particles (quanta): this uncertainty has since turned out to be so fundamental that it confounds any attempts to use our visually derived macroscopic concepts by naive extrapolation to the invisible subatomic world (37). The same applies to events which occur at almost the speed of light, for which we also have no naive experiential basis.

These developments in physics are perhaps the most compelling demonstration that experienced phenomena rather than made-up noumena are the basis of knowledge. In that connection it is surprising to see that even today some quantum theorists consider so called "objective probability" as a fundamental aspect of quantum mechanics (42), while others state unequivocally that "objective reality does not have any place in our fundamental description of the universe" (43, p.183); it is not clear though that this aspect has been systematically investigated by theoretical physicists. One often gets the impression of an uncontrolled "random fluctuation" between a noumenalistic and an observational point of view, and this even in discussion dealing with the recent experimental disproof of the so-called "local realistic" interpretation of physical nature. "The philosopher must henceforth interpret physics in terms of operations and their results alone, leaving external existence out of account. But the physicist, finding the picture of an external world indispensable, began to devise a better one .... however.... all such pictures are but an aid to investigation and have no fundamental significance whatever" (44). This opinion expresses well the ad hoc nature of concepts in relativity and quantum theories - which they share, of course, with all other concepts.

One can also encounter the statement that we, the observers, "create", for instance, the elementary particles: we create the concepts, without doubt: our observation may interfere with the "behavior" of the small particles: they might not be known to exist except for our observation: some properties can be only expressed in terms of probability (i.e., a function of our knowledge): but all this is not the same as claiming that we create particles, or some other aspect of the external world. It seems that once again thinking and world have been confused: the conceptual sphere (or "world") is not identical with the "origin" (the unconceptualised world). Otherwise, there would be no difference between the concept of a thousand dollars in one's head, and a real thousand dollars - as Kant noted.

Our notion of causality is derived from the observation of continuity of events: an earlier constellation is said to cause a later one. This concept is a macroscopic one, and does not include subatomic events such as the "jumping" of quanta or radioactive decay which can only be described with statistical methods. Up to now it is not possible to determine whether the particles somehow communicate with each other, with the statistical effect as the resultant, or whether the latter occurs without such communication. We have to accept the statistical effects as such, being an aspect of our observation, and speculations about the "behavior" of individual particles go beyond what we can ascertain at present. In this reasoning, the question whether or not nature, or God, plays dice, is not relevant. The objections of Einstein and collegues (37) and of Popper (40) to the "Copenhagen interpretation" of quantum physics appear to be an outcome of their objective (i.e., metaphysical) attitude. If that is so, some such questions cannot be decided by experiment, but

rather need epistemological clarification: this possibility is at least worth considering.

We know in as much as we have ideas and believe in them: for this reason animals do not know in the same way, even though they are clearly in touch with and react without concepts to their world, which has characteristics similar to those of our unknown world. (As mentioned earlier, one may disagree with this definition of "knowledge", and insist that animals do know: this is a matter of terminology which could be resolved in different ways. For present purposes the term is used as identical with "conceptual knowledge"). Developmental considerations are evidently once again of importance at this point. Human experience concerns conceptual knowledge, with language as its most conspicuous component: it is a new sphere which is superimposed upon the animals' unconceptualised world. That does not mean that knowledge replaces the world, nor that the old world has become a "knowable world-in-itself".

If knowledge concerns our conceptual mental content which only produces approximations to the unconceptualised outside world, it follows that "objects" are something less definitive than is commonly assumed. As a consequence, the relation of theories to the outside changes slightly but clearly. It used to be assumed that one constructs approximate theories about definitive external properties of the world, and discrepancies were thought of as imperfections in measurement of these definitive properties: and that subsequently the theory is improved to reflect these definitive properties. The situation changes if it is accepted that one can only know (i.e. approach) a world in flux with the help of our conceptual tools which serve as scaffolding. This happens for instance in the so-called randomly

exact methods (10): where one deliberately starts with mathematical approximations known to be imprecise but which then are made more exact in the course of interaction (sampling), to the desired degree. This way of proceeding would seem to be close to, or an extension of, physiological and perceptual functions, while the old one reflects the notion of external ideal states (i.e. the projection of our static ideas upon the world) which in principle must be metaphysical in type.

The above interactive process is typical in that it involves both analytic and synthetic functions simultaneously, and this would seem to be the case for all practical (involved) activity. The separation of analytic (exploratory) from synthetic (action-directed belief-based) thought is to some extent artificial - but it can be done and occurs, for instance when science confronts religion. That however does not prove that it must be that way. At least it is possible to "shuttle" between the two functions, with temporary structures serving as bases for action as well as for exploration, while immutable mental structures are recognised as fallacies.

This does not advocate wishy-washiness as a general principle, but rather reminds us to be in constant functional contact with the bases of assumptions (by means of ever present doubt) which we stabilise ourselves by adopting them. This stabilisation process is indeed very necessary, and cannot be replaced by opinion polls or committee recommendations. Traditionally it was provided by doctrines of some sort, which in turn were based on metaphysics. What now? The categorical imperative or similar rules would seem to be the best approach. How much certainty can be derived from it will need further exploration. - A related question is the cohesion between "intellectual" and "spiritual" thinking. It is nowadays almost

taken for granted that there is an unavoidable split between these two - but this was not always so. And indeed, a unitary epistemological point of view does not dictate such a split: on the contrary, it could be a needed step for synthesis in a contemporary world view.

Going back to the unitary roots of experience has similarities to Eastern philosophical trends, as seen for instance in Zen Buddhism, which advocates union of subject and object, and advises against being swayed by the power of ideas (see, for instance, 25). The proposition by Zen Buddhism that beliefs, and ideas in general, are errors (36) can perhaps be understood as somewhat overstating the temporary ("scaffolding") nature of our intellectual tools. This parallel has also been used to illustrate contemporary physics (for instance 26,27) but it does not establish a bridge within science to scientific knowledge which most Western scientists would insist upon, lest going back to the roots be considered as an unpermissible excursion into mysticism. The overall problem here seems to be the opinion of some writers that: because a rational approach does not bring all the answers, rationality can be jettisoned, and altogether replaced by mystical insights. For similar reasons, the term "metaphor" should not be used to describe scientific concepts since it can convey the impression that one metaphor is as good as another, and thus the approximation effort is lost sight of. If on the other hand it can be demonstrated to everyone's satisfaction that our present scientific conceptual structures are our mental approximations, that is, a scaffolding which we erect (even if on a long term basis) essentially in a temporary or ad hoc fashion, the situation changes, because the argumentation starts from within the accepted way of thinking, and if the present argumentation is on target, it should be possible to do that, even if it affects the foundations of science. The

situation has parallels with the introduction of relativity: it was possible to argue on general principles that Kant's apriori time and space cannot be maintained, but it took Einstein's thought-experimental argumentation starting from within accepted science to convince his fellow scientists.

This situation contains some possible paradoxes. For instance, it may be argued that one cannot rationally discuss an unconceptual (and thus irrational) state of mind: this reasoning is, however, not convincing: we can, and do, discuss irrational events and states of mind all the time. It is true that discussing such a state differs from being in it: but that does not imply a dissociation, because we all have memories of states of less than complete rational awareness, such as drowsiness, dreams, and perhaps fainting, etc. Thus we have both an intellectual and an experiential access to this area.

There is another paradox: although the preoccupation with ontological truth in Western thinking turns out to be fallacious in principle, it clearly has been a powerful motivator for scientific search (eritis sicut deus, scientes bonum et malum), while on the other hand a contemplative life with unification of experience discourages the preoccupation with these (or other) ideas and promotes a more immediate and personal type of insight and satisfaction, commonly associated with inactivity. What then will happen to our Western science, once the quest for absolute certainty is abandoned? (We can consider this as an irreversible trend which was signaled by Descartes' half-hearted doubt and which became obvious three centuries later). If we look at the present situation, it would seem that social and oecological concerns are taking

over from absolute truth as prime motivators for work at mastering the world. Striving toward "the Good" can and must continue to be a goal, as it has been since antiquity: that it cannot be "objectified" (25) makes it immune to the problems which have plagued ontological truth. Such a shift can help to examine the question of desirability (such-and-such can perhaps be done, but should it?) which is left open in an unconditional search for truth, and it may facilitate a unification of morals and knowledge. - One can also understand the scientist's work from a slightly different perspective: he tries to find out what is "behind" what we already know. In science this amounts to a peeling of an onion in which removal or penetration of one layer leads to another one which in itself is never a final one. Seen from here, the ontologically inclined scientist looks instead for a hard core, as in a cherry - but the only means to find such are metaphysically founded assumptions.

The conceptual function, i.e., the conceptual world view and the conceptual self identity, needs to be built up (constructed) and maintained throughout life in an active bio-psychic process: otherwise it does not appear, or it decays, while the non-conceptualised external world does not have these characteristics. The continuing construction and maintenance process, even though it can be likened to the task of Sisyphus, is in some contrast to the decline of non-psychic biological function in later life, and for this reason, together with some other factors such as the communicability and quasi-independence of ideas, it probably gave rise to the idea of life after death. Awareness of the temporary (ad hoc) nature of the constructed scaffolding may help, however, in preventing hybris.

EPISTEMOLOGY AND PSYCHOPATHOLOGY

Psychotic disorders conversely can be understood as a form of "living death", because in them a malfunction of the highest, especially of the conceptual mental processes occurs. They constitute an "alienation" because the individual and social "mental home" of the person (his identity) has disintegrated. Much present evidence points to a dysfunction of the prefrontal cortex in chronic psychosis (12), which together with related structures normally regulates and guides simultaneously the sensory, motor, and autonomic functions in order to prepare the organism to respond to perceived events and configurations, responds to meaningful stimuli and probably maintains functional mental structures. On the basis of test results with healthy persons (18), it may be expected that in right handed patients the left frontal cortex is more impaired than the right. It has also been reported that in psychosis the cortical metabolism in general is more decreased than the subcortical one, compared to healthy persons (22), so that both prefrontal and other cortical areas are relatively inactive. Concerning the pathogenesis, it has been suggested that a fixed anatomical or biochemical lesion from early in life interacts (and interferes) with other brain maturational events which occur later (34).

We can assume, with some speculation, that normally the prefrontal cortex is instrumental in constantly producing internal (conceptual) models which interprete and approximate the "world", as well as schemes for possible action dealing with it. Its dysfunction must then result in conceptual difficulties, characterised by inefficiency, inflexibility, rigidity, strong inversion, unconditional use of beliefs, and even patterns which arise independently of external input and in contrast to it. As an

overall result, conceptual thinking is no longer a well interpreted aspect of human activity.

In psychosis, a de-differentiation of sensory information occurs (13) which can be expected to interfere with the stability of perceptional structural units, e.g., "hastily sketched men" instead of clear perceptions of people (14), or hallucinations. Hallucinations are a particularly clear example of a mental function having lost superordinated control as well as not being caused by sensory input: they are to some extent a pathological parallel to the figure reversals which occur when regarding the Necker cube. There is also a decrease of certainty, blurring of identity (including sexual identity) and its boundaries, with a diminution of effectiveness and freedom (which needs effectiveness as a basis) of thought, choice, and action, in particular planned action. The diminution can be manifested for the patient by the ad hoc conviction that outside forces, of personal or impersonal type, take over the direction of his mental function to a large extent. In chronic paranoid psychosis, a pathological new permanent boundary or articulation between inside and outside may become established, far inward from the healthy ones: this is a result of the pathologically restricted competence and maneuvrability experience. The abnormal beliefs and concepts nevertheless still have a certainty or security function, as they do in the healthy state. Ideas can form a conscious center of existence under pathological conditions just as they do for healthy people (15). They provide relief from the fear produced by psychotic chaos through the word of certainty. Because their world approximating truth function is impaired in comparison to ordinary beliefs, their certainty function is more striking, as their raison d'être, and this draws our attention to the fact that "normal" beliefs do this too.

The paranoid subject usually is not able to convince others that his beliefs are valid, but that is not an unequivocal characteristic of false beliefs because the same sometimes happens even with valid scientific observations. In addition, some group beliefs are seen by others as untrue. One can perhaps say that maintenance of wrong beliefs in the face of clear proofs to the contrary is the stigma of delusions, but that is a matter of degree rather than all or nothing. On the other hand, such consensual validation is our main tool in dealing with new or unusual ideas. The most general and abstract beliefs are the most difficult ones to test in this way, and consequently they give rise to the most severe social conflicts, because they often have a strong influence on self-comprehension (identity) and conduct of life and of public affairs.

The above description of abnormal beliefs is functional, and also shows that in principle cerebral and psychic function can well be discussed as one. It is in contrast not helpful to use in this context a term like "projection", which means that the patient perceives his feelings in another person. This is not what the patient perceives: he finds someone steering him. It also does not describe the physiological disorder. It does describe the observer's opinion about what should be and how he thinks the patient deviates from it: thus in effect it is a translation from one erroneous belief into another one which is based upon the assumption of the general validity for everybody under all circumstances and at the same "location" of an apriori subject-object split.

Activity also can become quite disorganised in psychotic states, and it is, not surprisingly, the highest coordinating centers which show the most evident dysfunction: lack of initiative, of intentionality, of

formulations of goals for action, and also bizarre and poorly coordinated activity. This is in good agreement with the proposition (16) that the preparation for action is an important organising principle for mental structures. The decay of goal-directed action very likely constitutes one part of a vicious circle, of which the remaining ones are disintegration of perception and of the relevant cortical, subcortical, and biochemical mechanisms. Conversely, improvement of action can help to improve overall function, and it has for instance been reported that voluntary movement (even when it does not constitute a part of goal directed action) decreases the amount of abnormal slow electrical activity in fronto-central areas of psychotic subjects (17). Deliberate action goes together, of course, with the formation of opinions and of standards for behavior. In these areas again, there is no reason to treat subjective mental function differently from somatic events, provided the steps involved in obtaining knowledge are all clear.

Severe disorders, like autism or hebephrenia, spontaneous mood swings, impulse disorders, delirium, dementia, etc., cannot easily be reached by "subjective" methods such as empathy or identification, and are therefore more easily comprehended in an "objective" way as due to a brain disorder of structural or functional type. Conversely neurotic or personality disorders, as well as the supposedly normal fanaticisms, which do not involve a psychotic conceptual decompensation, tend to be primarily seen as varieties of the common (subjective) human experience, even when there is a marked restriction of freedom to perceive an' act (i.e., a narrowing of ego boundaries) which patients sometimes describe as being in a "cage". But even though there is the striking phenomenon of the psychotic breakdown and decompensation, which separates types of disorder, it must be

remembered that such differences concern degrees of dysfunction of brain and mental mechanisms rather than being fundamental, and the same is true for the subjective and objective approaches. If this is not kept in mind, unproductive discussions may arise about which point of view is "correct". Psychoanalysts try to go to the roots of subjective experience in normal and pathological conditions, bu they run the risk of two major complications: firstly they usually do not consider brain function at all; and secondly they invariably end up with some kind of mystification because they want to have a comprehensive conceptual scheme for all of "mind" which is only possible with marked overdetermination. Conversely, some brain scientists seem to say that the mind is a sort of "secretion" of the brain, an organic epiphenomenon. The situation with regard to the subject-object split is of course here in principle the same as in other areas of knowledge, but it is more central here because it applies not only to the observer but also to the observed.

The importance of epistemology to psychiatry is primarily in the theoretical aspects, concerning the concepts, for instance, of brain dysfunction, subjective mental function, social function, etc. If we are faced with epistemological frameworks which tell us that the mind and the brain can never be brought together we are, as clinicians, in a very unsatisfactory and awkward situation. The split between these two aspects goes right through the center of our daily work, and in practical terms it has given rise to various dogmatic positions and to professional fractionation. If we want to remedy this we must examine the basis and origin of knowledge itself, and this is what has been attempted here.

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REFERENCES

1. Arendt H. The Human Condition. Chicago and London, 1958: The University of Chicago Press.
2. Livingston KE. Introduction. In: Livingstone KE, Hornykiewicz O. (eds). Limbic Mechanisms. The continuing evolution of the limbic system concept. New York and London, 1978: Plenum Press, XIII-XV.
3. Heidegger M. Sein und Zeit (1926), 7th edition. Tübingen: Max Niemeyer Verlag, 1953.
4. Popper KR, Eccles JC. The Self and Its Brain. New York, Springer International, 1981.
5. Jaspers K. Philosophie, 4th edition, Berlin, etc. 1973: Springer-Verlag. Vol. I, Philosophische Weltorientierung, Vol. II, Existenzerhellung, Vol. III, Metaphysik.
6. Ellis WD. A source book of Gestalt psychology. New York: The Humanities Press, 1950.
7. Quinton A. Popper. In: Edwards P. (ed). The Encyclopedia of Philosophy, New York, 1967: Macmillan, Vol.6, pp. 398-401.
8. Russell B. The Problems of Philosophy. London, etc., 1912, 1974. Oxford University Press.
9. Glasersfeld E von. Reconstructing the concept of knowledge. Seminar on Constructivism, Archives Jean Piaget, Geneva, June 25-29, 1984.
10. Doll JD, Freeman DL. Randomly exact methods. Science, 1986: 234: 1356-1360.
11. Szentagothai J. Theorien zur Organisation und Funktion des Gehirns. Naturwissenschaften 1985: 72: 303-309.
12. Müller HF. Prefrontal cortex dysfunction as a common factor in psychosis. Acta psychiat scand 1985: 71: 431-440.

13. Buchsbaum MS, Awsare SV, Holcomb HH, DeLisi LE, Hazlett E, Carpenter WT, Picker D, Morihisa JM. Topographic differences between normals and schizophrenics. The N 120 evoked potential component. Biological Psychiatry. 1986: 15: 1-6.

14. Schreber DP. Denkwürdigkeiten eines Nervenkranken (1903). Frankfurt. 1985: Taschenbücher Syndikat/EVA. Band 52/53.

15. Jaspers K. Allgemeine Psychopathologie. 4th edition. Berlin and Heidelberg: Springer-Verlag 1946.

16. Brief JC. Beyond Piaget. A philosophical psychology. New York. Teachers College Press. 1983.

17. Grözinger B, Heher KD, Westphal IP, Diekmann V, Kornhuber HH. The EEG in schizophrenia. Changes in relation to voluntary movement in the theta and delta band. Naturwissenschaften. 1984: 71: 320-321.

18. Gevins AS, Morgan NH, Bressler SL, Cutillo BA, White RM, Illes J, Greer DS, Doyle JC, Zeitlin GM. Human neuroelectric patterns predict performance accuracy. Science 1987: 235: 580-585.

19. Kant I. Kritik der Reinen Vernunft (1781). R Schmidt (ed). Leipzig. 1930, 1944: Felix Meiner.

20. Schnapf JL, Baylor DA. How photoreceptor cells respond to light. Scientific American 1987: 256: 40-47.

21. Glasersfeld E von. Learning as a constructive activity. Conference of the International Group for the Psychology of Mathematics Education. Montreal. 1983.

22. Gur RE, Resnick SM, Alavi A, Gur RC, Caroff S, Dann R, Silver FL, Saykin AJ, Chawluk JB, Kushner M, Reivich M. Regional brain function in schizophrenia. Arch. Gen. Psychiatry. 1987: 44: 119-129 (2 articles).

23. Walsh WH. Kant. In: Edwards P. (ed). The Encyclopedia of Philosophy. New York, 1967: Macmillan, Vol.4, 305-324.

24. Williams B. Descartes. In: Edards P. (ed). The Encyclopedia of Philosophy. New York, 1967: Macmillan, Vol.2, 344-357.

25. Pirsig RM. Zen and the art of motorcycle maintenance. Toronto, New York, London, 1974: Bantam Books.

26. Jonas RS. Physics as metaphor. New York and Scarborough, 1982: Meridien Book, New American Library.

27. Zukav G. The dancing Wu Li Masters. An overview of the New Physics. New York, 1980: Bantam Books.

28. Weizsäcker CF von. The unity of nature. New York, 1980: Farrar, Straus and Giroux, Inc.

29. Hanson NR. Quantum mechanics, philosophical implications of. In: Edwards P. (ed). The Encyclopedia of Philosophy. New York, 1967: Macmillan, Vol. 7, 41-49.

30. Walsh WH. Metaphysics, Nature of. In: Edwards P. (ed). The Enclyclopedia of Philosophy. New York, 1967: Macmillan, Vol.5, 300-307.

31. Wilber K. Up from Eden. A Transpersonal View of Human Evolution. Boulder, Colorado, 1981: Shambhala Publications Inc.

32. Mishkin M, Appenzeller T. The anatomy of memory. Scientif. American 1987: 256: 80-89.

33. Harth E, Unnikrishnan K.P., Pandya A.S. The inversion of sensory processing by feedback pathways: a model of visual cognitive functions. Science 1987: 237: 184-187.

34. Weinberger DR. Implications of normal brain development for the pathogenesis of schizophrenia. Arch. Gen. Psychiatry. 1987: 44: 660-669.

35. Einstein A. Zur Elektrodynamik bewegter Körper. Annalen der Physik, 1905: 17: 891-921.

36. Benoit H. The supreme doctrine. New York, 1984, Inner Traditions International.

37. Hanson NR. Quantum mechanics, philosophical implications of. In: Edwards, P (Ed). The Encyclopedia of Philosophy, New York, 1967 MacMillan, Vol. 7, pp. 41-49.

38. Caputo JD. Heidegger and Aquinas. New York, 1982, Fordham University Press.

39. Kranz W. Vorsokratische Denker. Berlin & Frankfurt, 1949, Weidmann.

40. Popper KR. Popper versus Copenhagen. Nature, 1987: 328: 675.

41. Schmitt R. Phenomenology. In: Edwards P (Ed). The Encyclopedia of Philosophy, New York, 1967, MacMillan, Vol. 6, pp.135-151.

42. Shimony A. The reality of the quantum world. Scientific American, 1988, 258, 46-53.

43. Gribbin J. In search of Schrödinger's cat. New York, 1984, Bantam Books.

44. Dingle H. Relativity: philosophical consequences. In Encyclopedia Britannica, 1964, Vol. 19.

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